REMARKS

Claims 1-8 are pending in the application.

A Replacement Sheet of FIG. 3 is provided, in which text labels for Markers 31 and 32 have been corrected in FIG. 3. No new matter is added. Approval of the replacement drawing sheet is respectfully requested.

Claim 1 recites a moving object tracking apparatus for detecting and tracking one or more moving objects in an environment, including an optical system having a hyperboloidal mirror for capturing visual field information in a 360° field; a single **stationary** camera for converting the captured visual field information to image information; and an information processing section for processing the image information, where the information processing section detects and tracks the one or more moving objects based on the image information.

Referring to FIGS. 1-3, e.g., a hyperboloidal mirror 10 obtains 360° visual field information, and a single stationary camera 11 converts the captured visual field information to image information (see specification at page 13, lines 11-16). As shown in FIG. 2, an all-direction image 21 of the 360° environment can be displayed, and a panoramic image 30 can be obtained (see FIG. 3) by subjecting the all-direction image to image processing (see page 14, lines 13-17). Markers 31 and 32 are provided to enable tracking of moving objects 33 and 34 (see page 14, lines 19-23).

Applicants' claimed invention provides significant advantages. Because the camera is fixed and stationary, maintenance is substantially not required during long-term operation, and a highly reliable and stable operation can be realized (see specification at page 34, lines 9-14). Further, as one camera (a "single" stationary camera) is required, this results in an inexpensive moving object tracking apparatus (see page 34, lines 15-16). The Applicants' invention does not require complicated circuitry for controlling the movements of a camera, as needed in conventional technology (see page 35, lines 13-15), such as that disclosed in Korein.

Claims 1-6 were rejected under 35 USC 103(a) as being unpatentable over U.S. Patent 6,226,035 to Korein et al. (hereinafter "Korein") in view of U.S. Patent 6,304,285 to Geng. Claim 7 was rejected under 35 USC 103(a) as being unpatentable over Korein in view of Geng, and further in view of U.S. Patent 5,953,449 to Matsuda et al. Claim 8 was rejected under 35 USC 103(a) as being unpatentable over Korein in view of Geng, and further in view of U.S. Patent 5,787,199 to Lee. These rejections are respectfully traversed.

The Korein reference does not teach or suggest a moving object tracking apparatus for detecting and tracking one or more moving objects which utilizes a single **stationary** camera.

Korein discloses an optical system that enables an image sensor to generate an image of either a wide angle view or a direct view of an area of interest (see column 2, lines 39-43). Specifically, in Korein, a wide-angle optical system 10 is mounted to the ceiling 18 of an area of interest 4 (see column 7, lines 14-15). The optical system 10 includes a mirror 12, preferably formed as a paraboloid (see column 7, lines 26-31). A planar mirror 14 is mounted at a 45° angle with respect to the horizontal plane of the ceiling for reflecting light rays from the mirror 12 (see column 7, lines 48-53).

Referring to FIG. 1, an image sensor 20 is mounted on the ceiling 18 via a vertically extending arm 24 (see column 6, lines 46-49). The image sensor 20 "is a video camera that can pan or tilt toward the area of interest 4" (column 6, lines 50-51). In particular, the image sensor 20 can move laterally (pan) and up and down (tilt) under electronic control (see column 6, lines 55-59).

In Korein, the image sensor/camera 20 is not **stationary**, as required in claim 1. Instead, the image sensor 20 is a video camera that can pan or tilt toward the area of interest, and optically zoom-in to capture a detailed view of a narrower region (see column 6, lines 49-54). As described in column 12, lines 37-41, the image sensor 20 in Korein must be **moved** (pan, tilt, and zoom) to appropriately track a moving object.

In Korein, a wide-angle view is obtained using the mirror 12 to provide a large area of coverage, and then a selected portion is viewed by panning, tilting, and zooming the image sensor 20 toward the object of interest 50 (see FIG. 5A; column 12, lines 6-54). As stated in column 12, lines 44-47: "The image sensor 20 is positioned to directly view the target 50 without the aid of the wide-angle optical system 10. Thus, the target 50 can be viewed from two distinct viewpoints."

Therefore, the image sensor 20 of Korein is quite different from the "single stationary camera" recited in claim 1. The problems inherent in a system similar to Korein were discussed in the Background section of the application (see specification at page 2, lines 1-6 and page 3, lines 1-16).

Geng discloses an omni-directional imaging system including a reflective mirror for viewing an object within a hemispherical field of view from a single virtual point. In the Office Action, Geng was cited for teaching a hyperbolic mirror in a 360° environment (see page 3, last paragraph). However, even if the hyperbolic mirror of Geng were used in the imaging system of Korein, it would not be possible to obtain the Applicants' claimed invention. Also, there would be no motivation to incorporate the CCD camera of Geng in Korein, as this would defeat the purpose of the image sensor 20 of Korein, where the image sensor 20 overcomes the deficiencies of prior art stationary cameras (see column 1, lines 32-56 of Korein). In other words, by specifically disclosing the use of a moving camera (image sensor 20), Korein teaches away from the use of a stationary camera.

Accordingly, Korein does not teach or suggest a stationary camera, as recited in claim 1, where Korein specifically teaches away from a stationary camera.

Korein also does not teach or suggest an information processing section that "detects and tracks" objects "based on the image information," as recited in claim 1.

In the Office Action, column 13, lines 48-57 was cited for allegedly teaching this feature. However, in this section of Korein, it is stated: "The computer system converts the location of the target in the motion detector's field of detection into a set of target coordinates in one of the coordinate systems" (emphasis added).

In Korein, the motion detector is separate from the computer system and supplies the target position "in the motion detector's field of detection" to the computer system 106, which then converts this target position to the coordinate system used by the imaging system. Therefore, Korein discloses that the motion detection is **not** based on the image information, but on external information input via an external motion detector.

Accordingly, Korein does not teach or suggest an information processing section which detects and tracks moving objects based on image information, as recited in claim 1.

For at least the reasons discussed above, the combination of Korein in view of Geng does not teach or suggest the Applicants' claimed invention as recited in claim 1.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,

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Amendments to the drawings:

The attached replacement sheet of drawings includes changes to FIG. 3 to correct inadvertent spelling errors of "marker". In FIG. 3, reference numerals 31 and 32 have been labeled correctly as "Marker 31" and "Marker 32", respectively, as provided on page 14, lines 19-23 of the specification. No new matter has been added.

Attachment: Replacement Sheet